

Figure 1

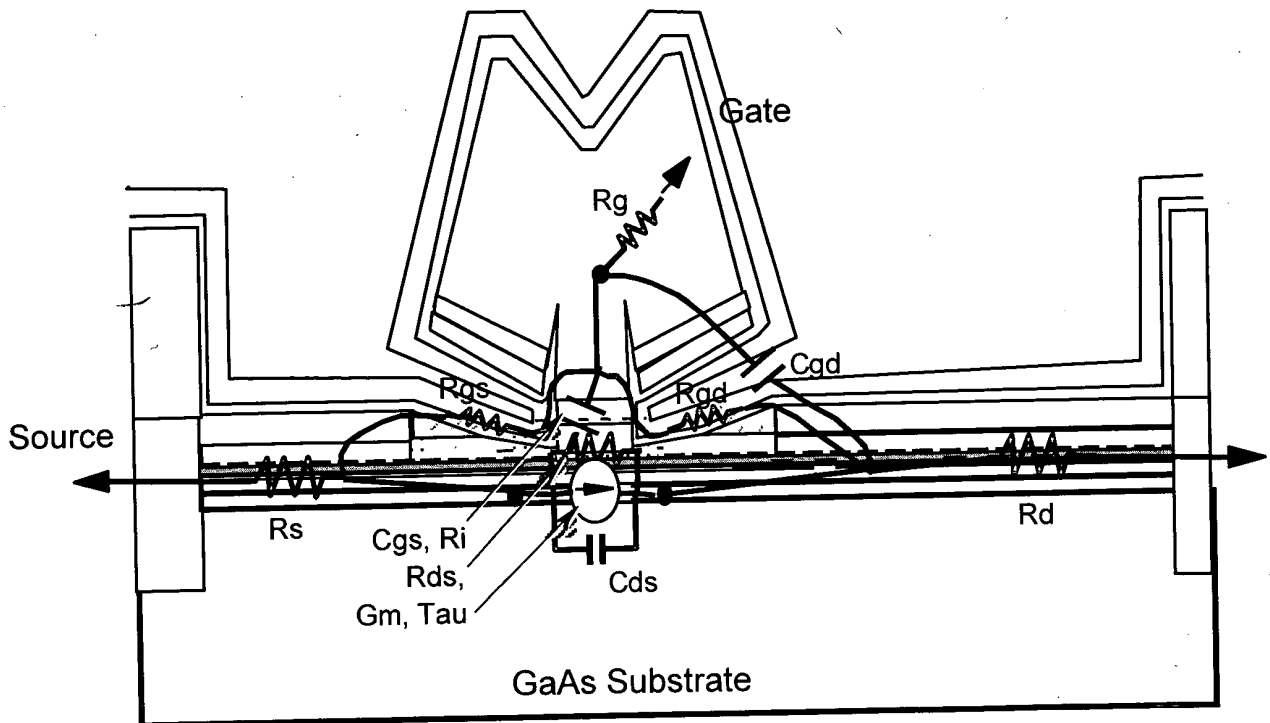


Figure 2

00904860

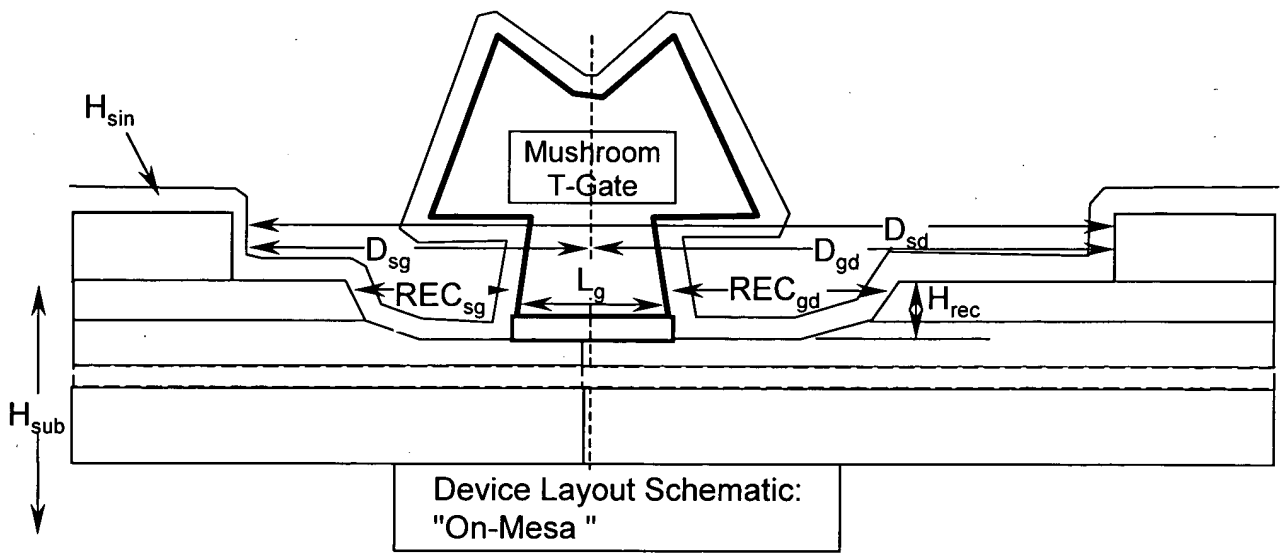


Figure 3

Single Recess Geometry

The diagram shows a cross-section of a device with a central gate region. The source and drain regions are on either side of the gate. The gate is labeled "Gate" and has a length  $L_g$  and position  $x_g$ . The source and drain widths are  $ws$  and  $wd$ , and the separation between them is  $wsd$ . The gate is positioned at a distance  $x$  from the source and  $xg$  from the drain. The gate is flanked by recessed regions with depth  $REC_{sg}$  and  $REC_{gd}$ . The substrate height is  $H_{sub}$ , and the gate height is  $H_{sin}$ . The recess depth is  $H_{rec}$ .

Ohmic Contacts		Recess Geometry	
Separation / $\mu m$	$wsd$ 2	Width / $\mu m$	$w$ .52
Source width / $\mu m$	$ws$ 10	Position / $\mu m$	$x$ .8
Drain width / $\mu m$	$wd$ 10	Depth / $\mu m$	$d$ .77E-07
		Angle / degrees	$a$ 60
Schottky Contact		Inter-electrode Capacitances / fF	
Gate length / $\mu m$	$L_g$ .15	$C_{gsp}$ 8.6	$C_{gdp}$ 8.1
Gate position / $\mu m$	$x_g$ .8	$E_{dsp}$ 43	<input type="checkbox"/> Auto

OK Reset Cancel

Figure 4

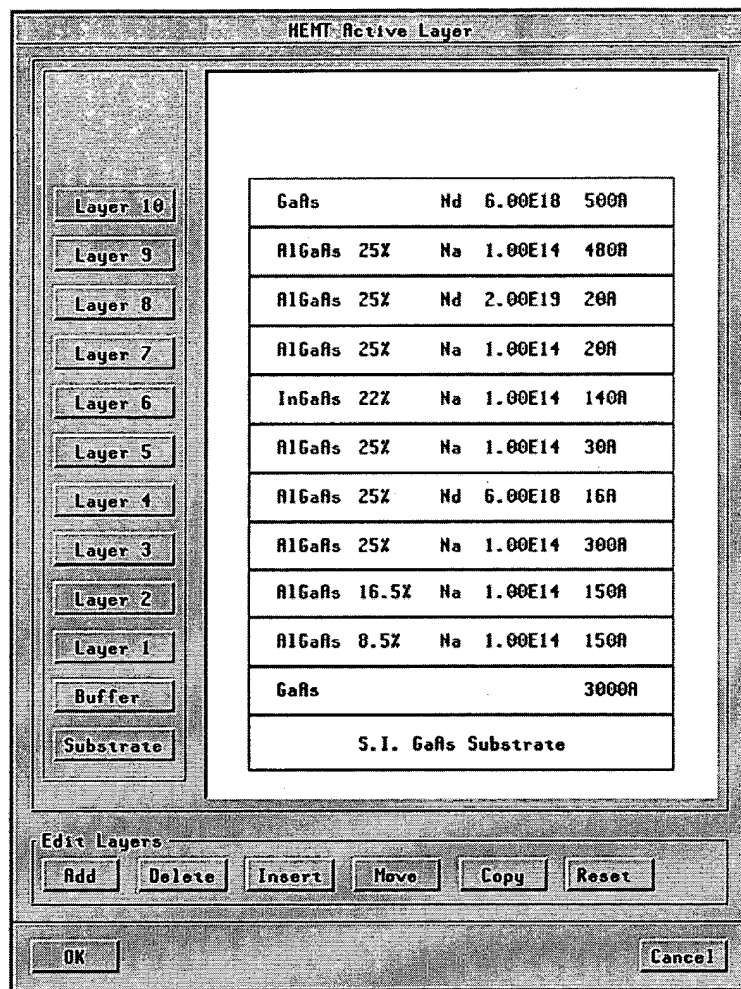


Figure 5

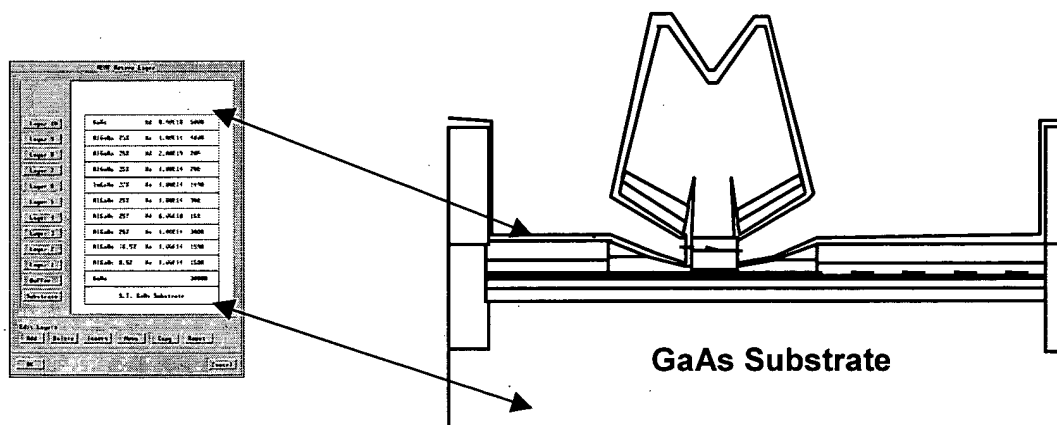


Figure 6

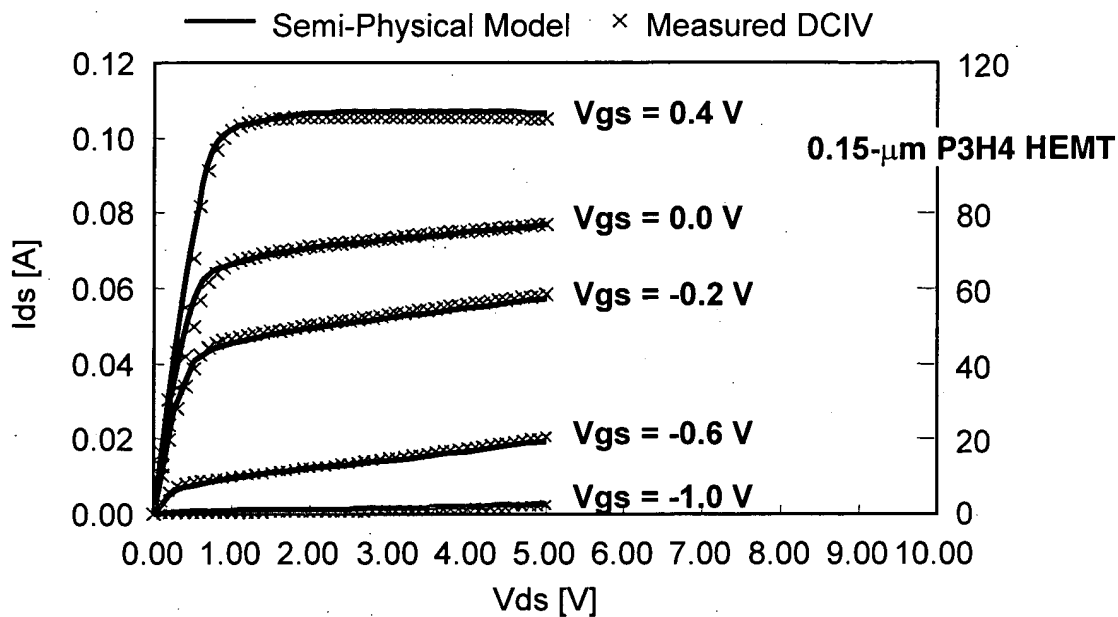


Figure 7

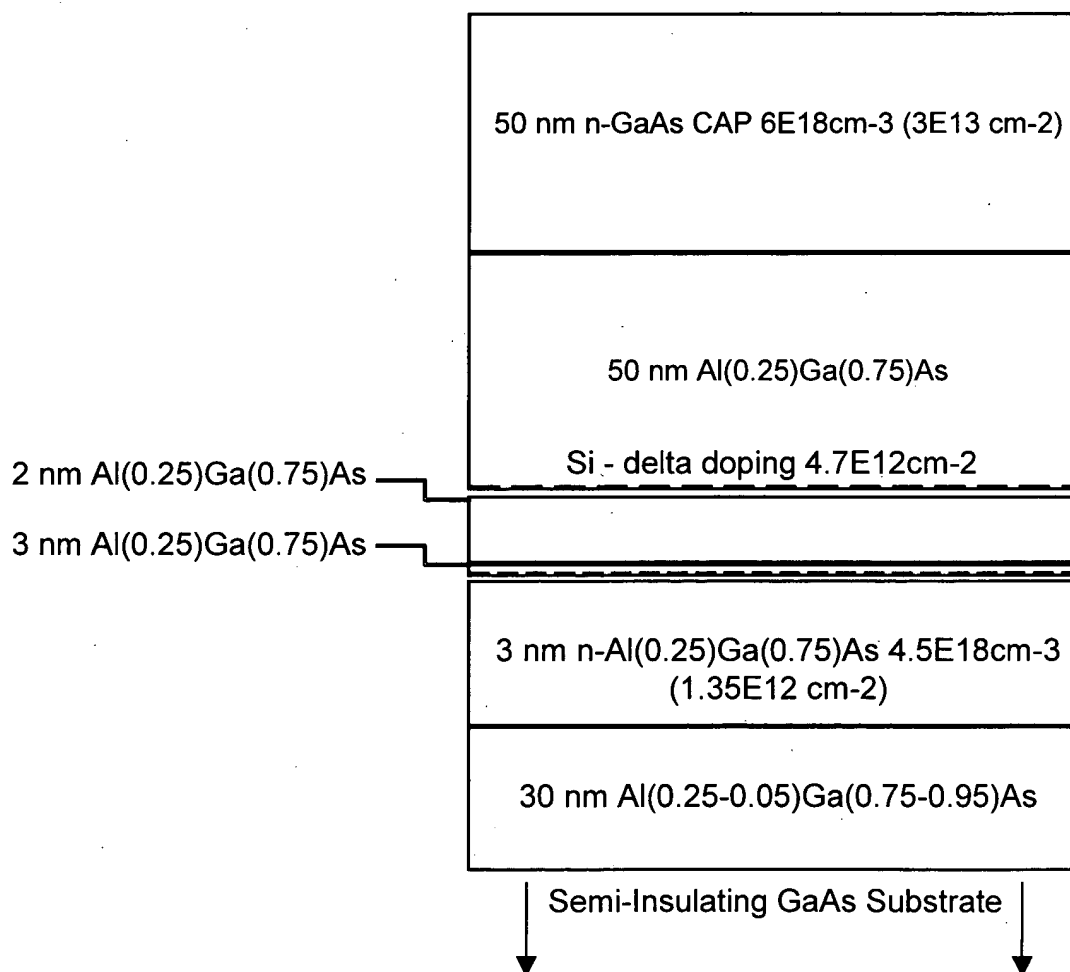


Figure 8



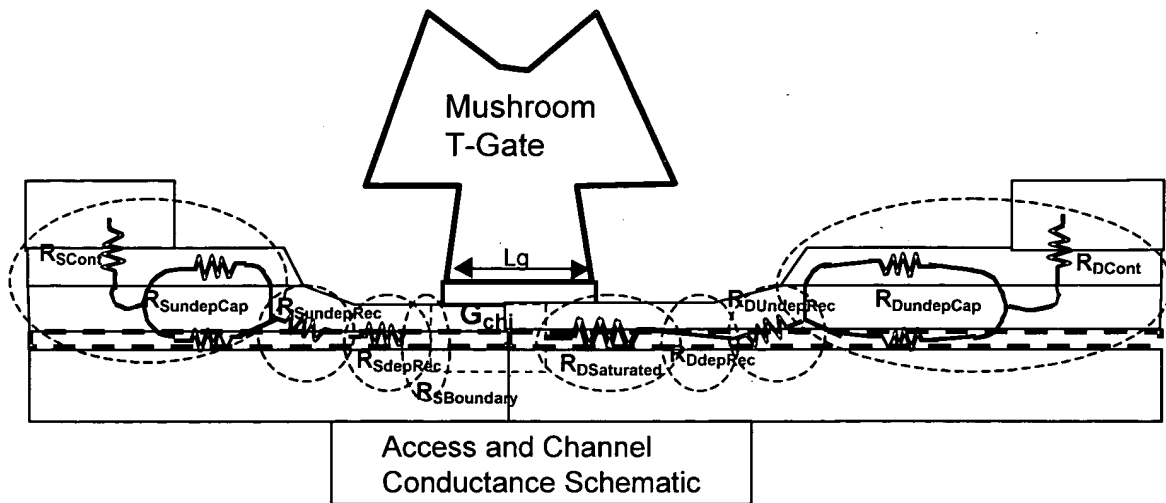
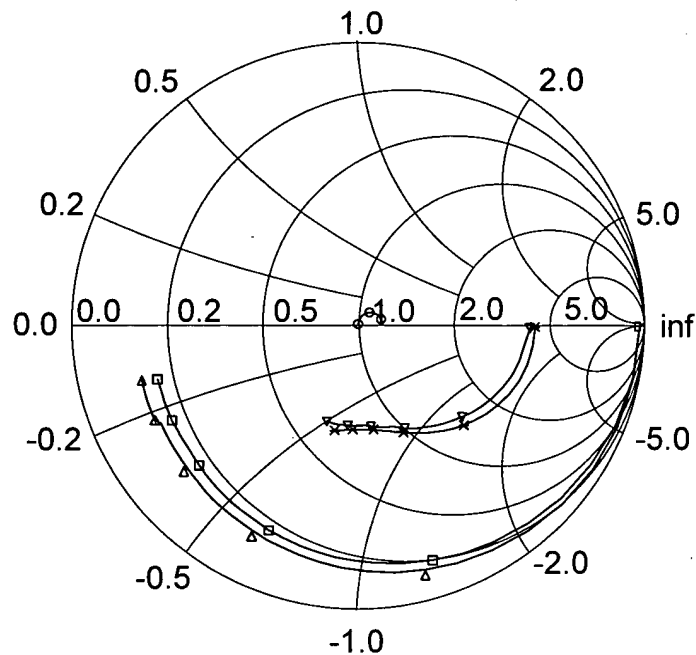


Figure 11

□ measure SMAT1 meas\_4200AB\_2vidpk-GTPA4 S[1,1]  
 ○ measure SMAT1 meas\_4200AB\_2vidpk-GTPA4 S[1,2]  
 ▽ measure SMAT1 meas\_4200AB\_2vidpk-GTPA4 S[2,2]  
 △ Simulated SMAT1 cp100-semiphys S[1,1]  
 ◇ Simulated SMAT1 cp100-semiphys S[1,2]  
 × Simulated SMAT1 cp100-semiphys S[2,2]

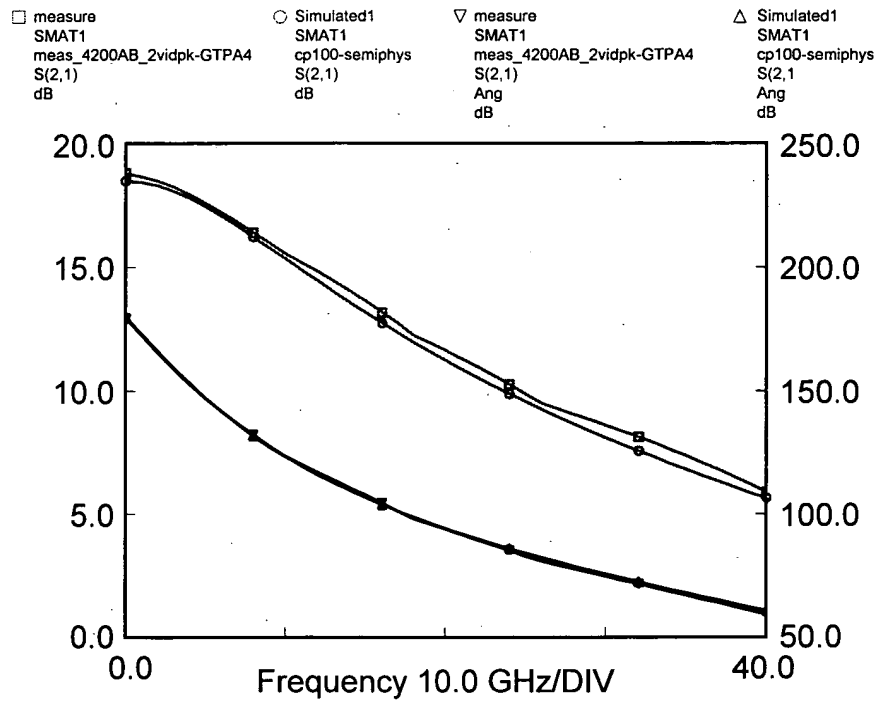


Frequency 0.05 to 40.05 GHz

Measured vs Modeled S-parameters  
 Simulated Equivalent Circuit Element Values  
 via Semi-Physical HEMT Model

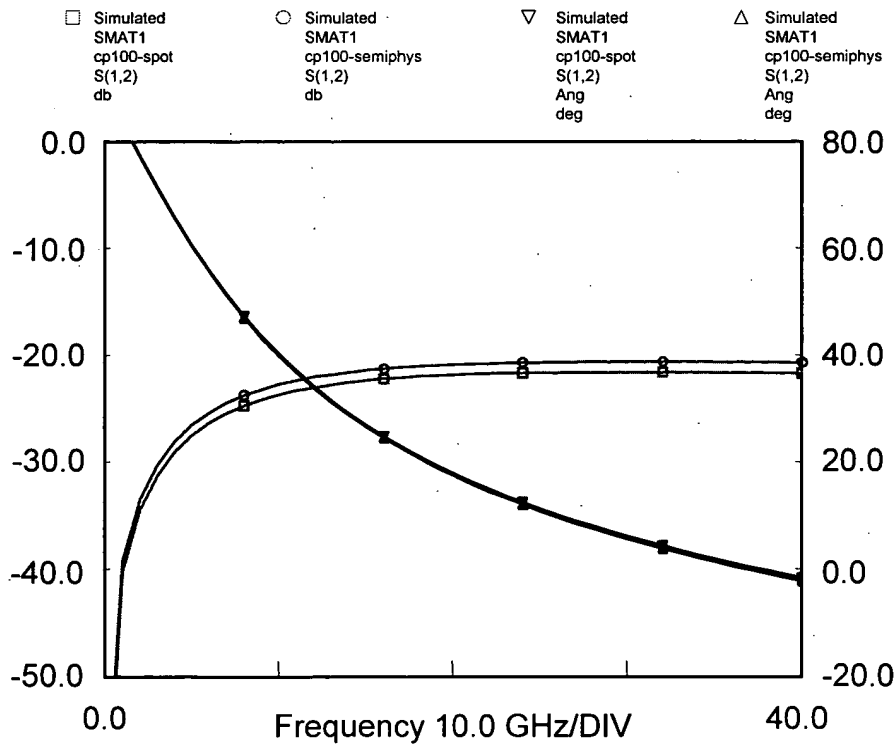
Figure 12

FOE240" 00504860



Measured vs Modeled S12  
Simulated Equivalent Circuit Element Values via  
Semi-Physical HEMT Model

Figure 13



Measured vs Modeled S12  
Simulated Equivalent Circuit Element Values via  
Semi-Physical HEMT Model

Figur 14

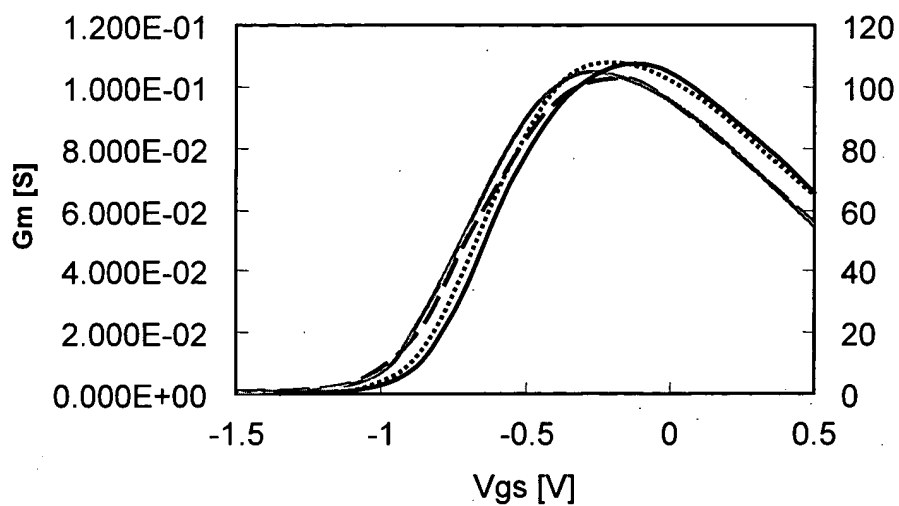


Figure 15

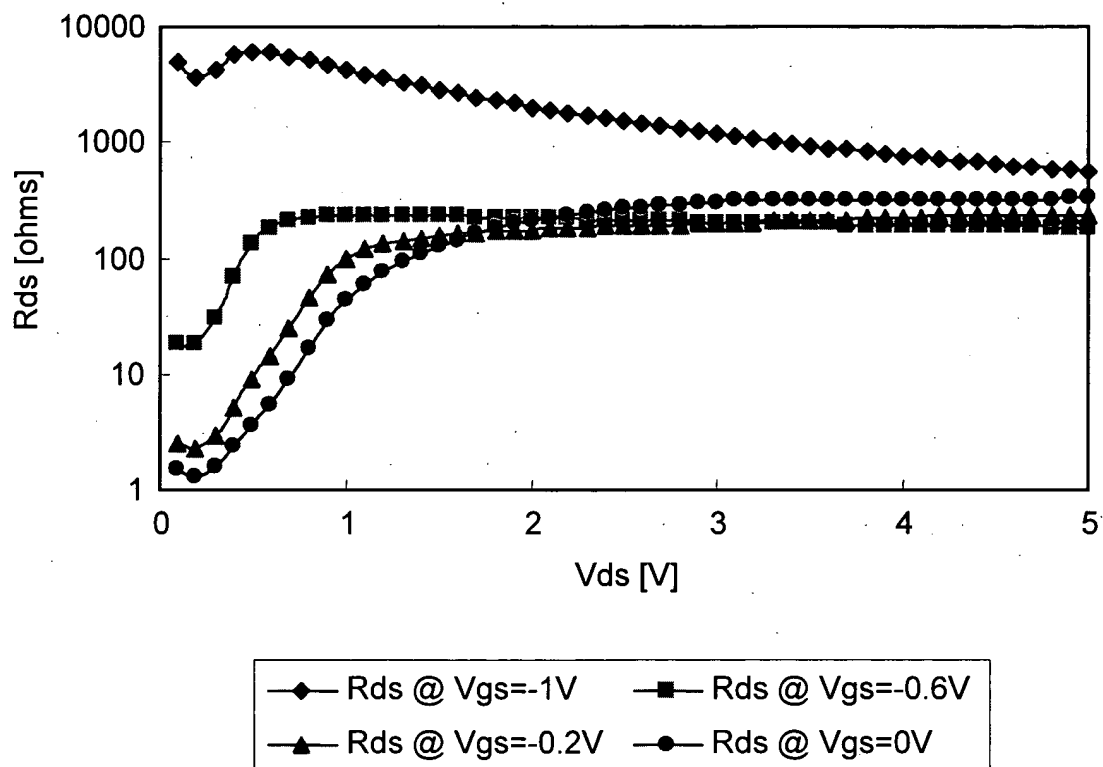


Figure 16



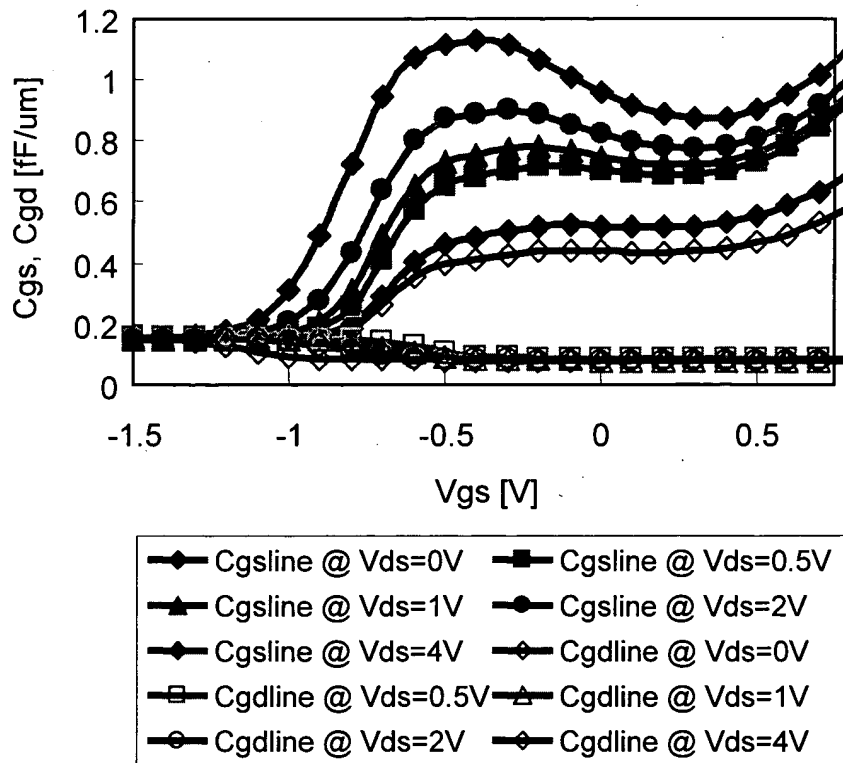


Figure 17

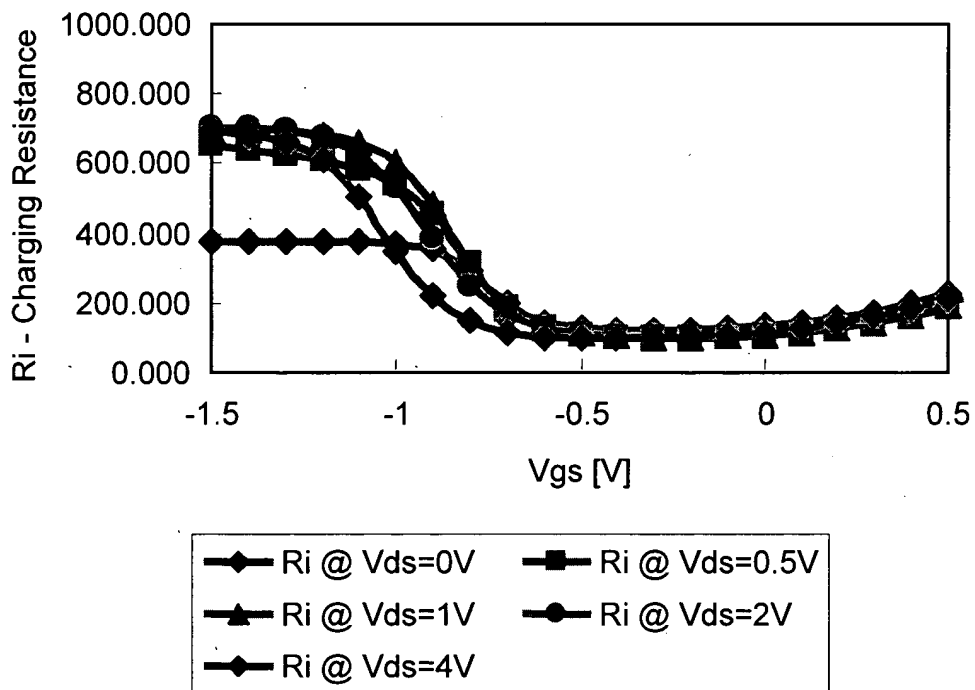


Figure 18

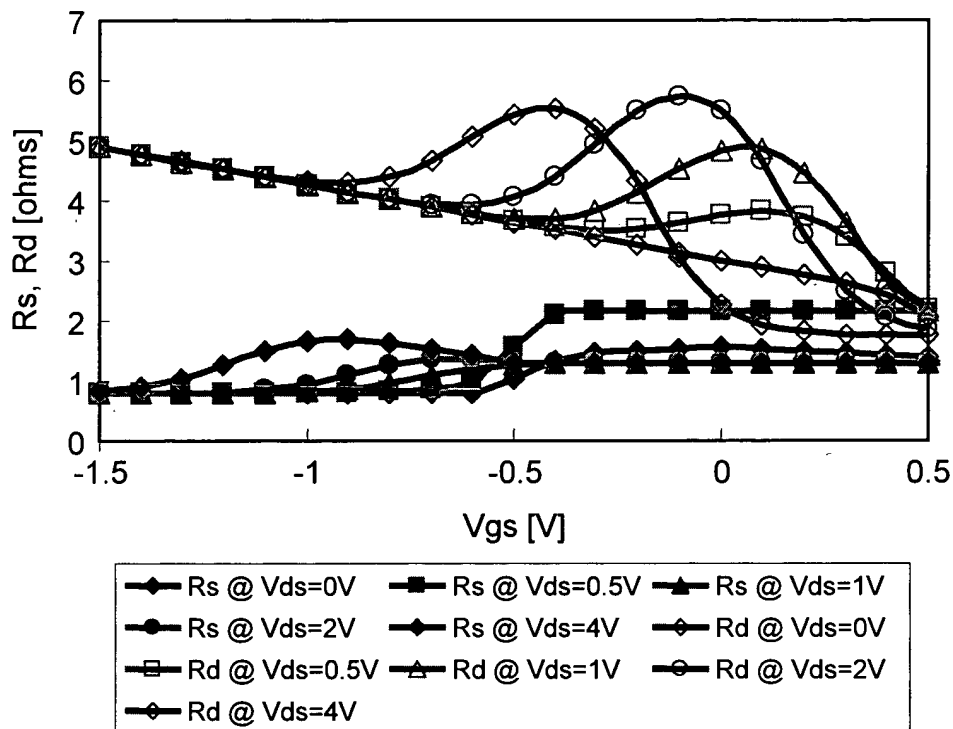


Figure 19

### Measured vs Simulated Bias- Dependent Gain @ 23.5 GHz

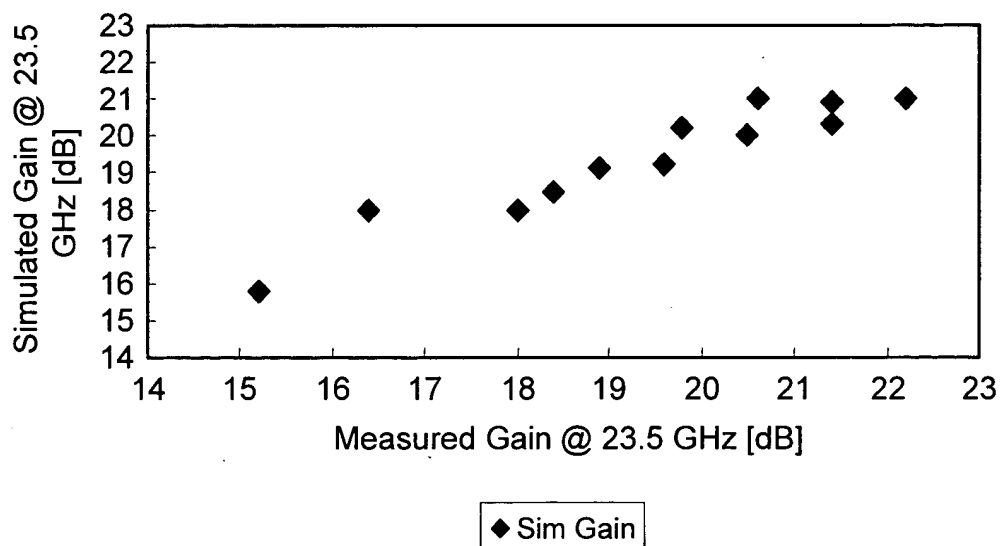


Figure 20

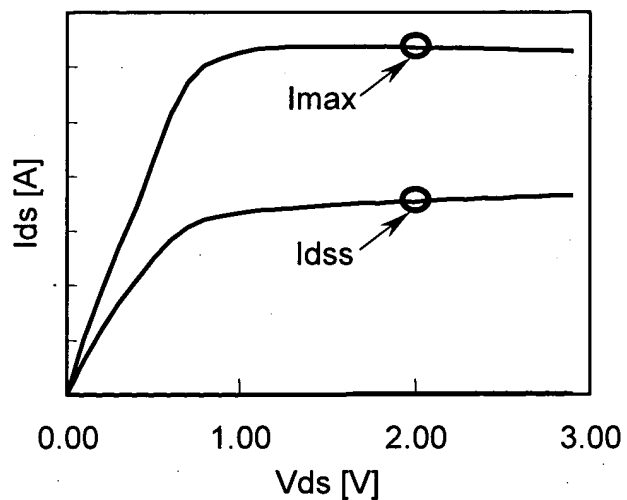


Figure 21A

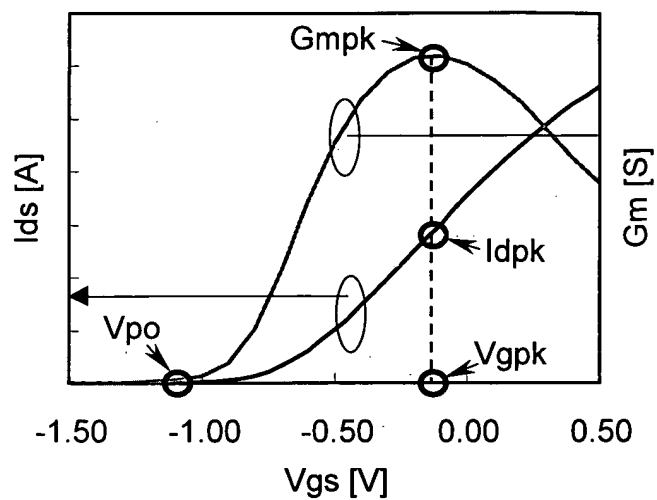


Figure 21B

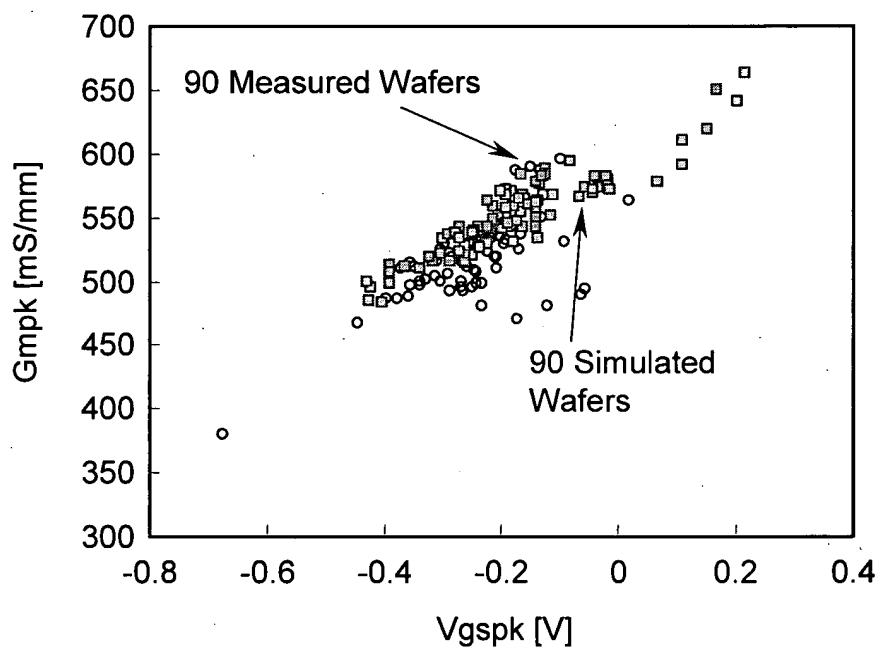


Figure 22

FOE240" 00904860

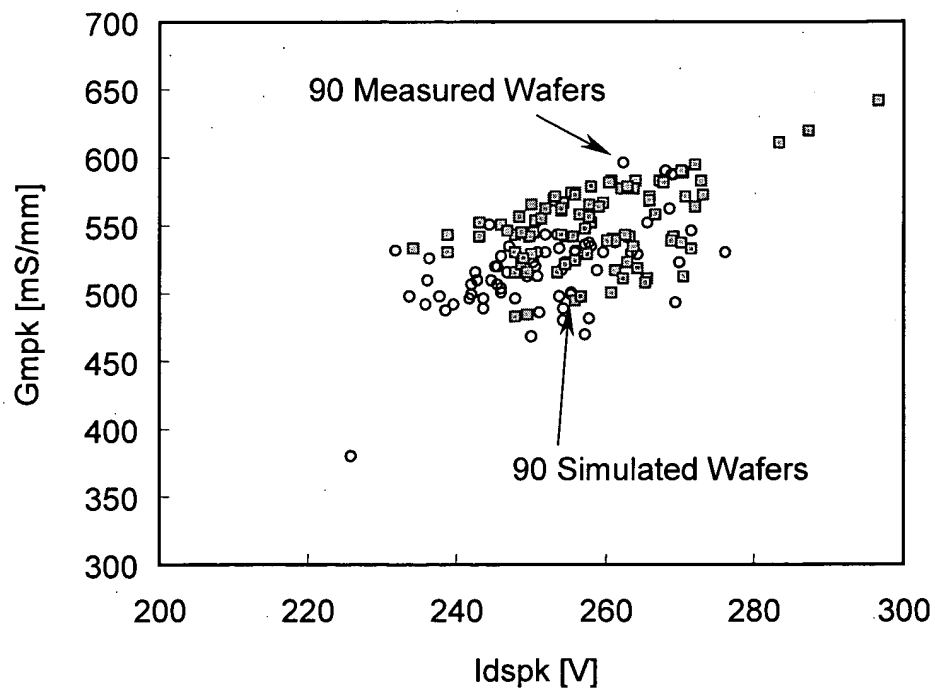


Figure 23

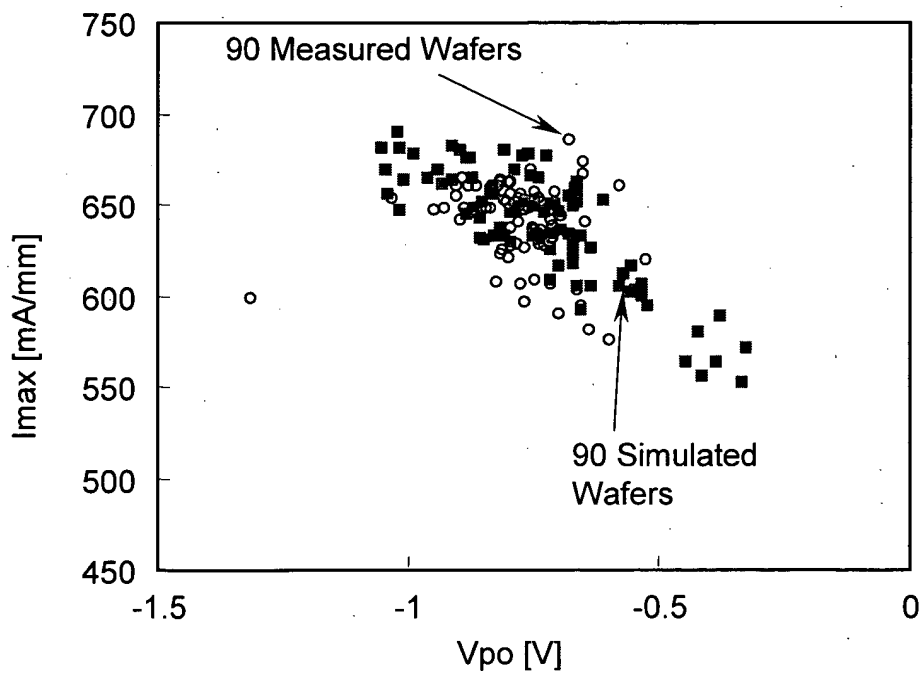
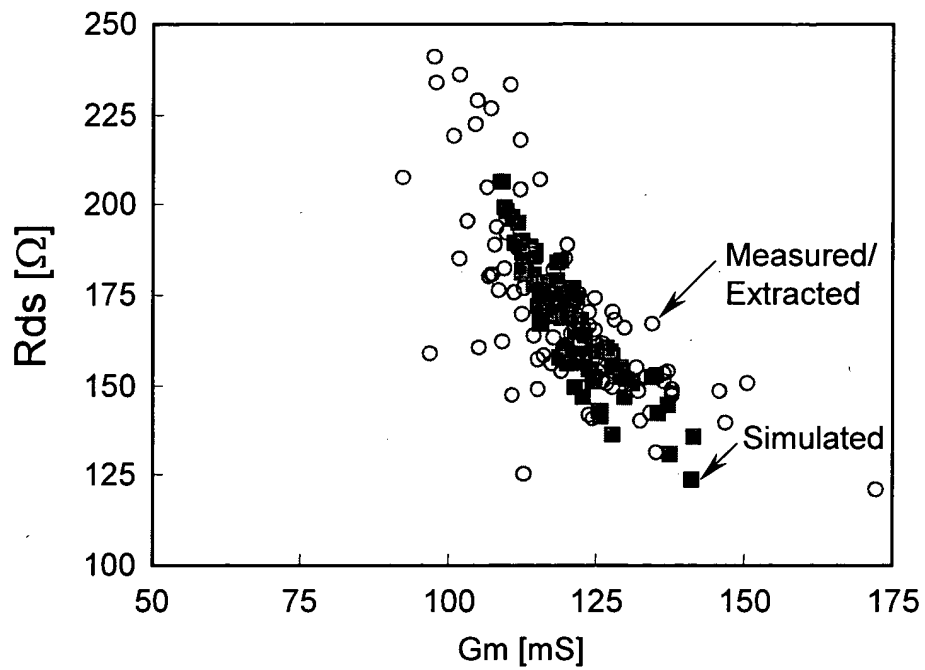
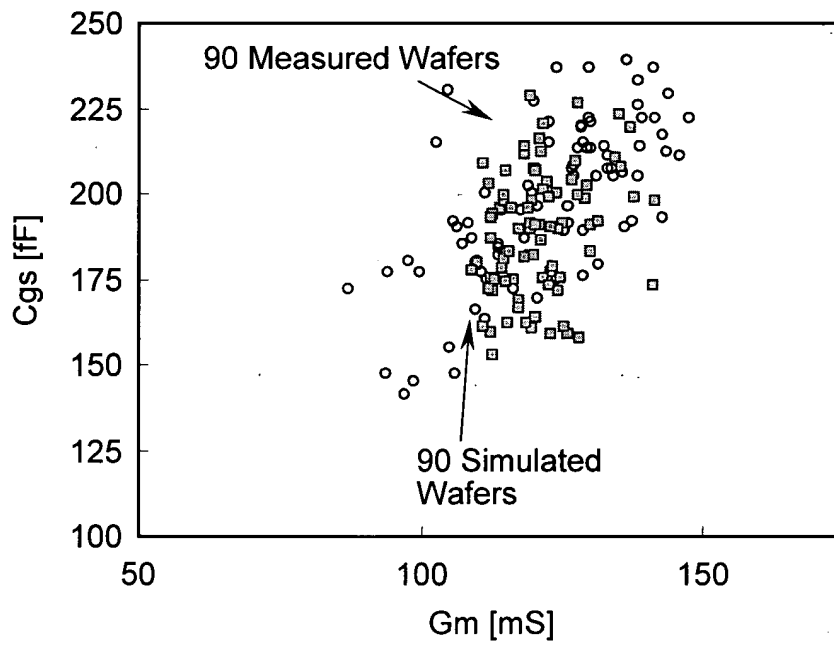


Figure 24



**Figure 25**



**Figure 26**

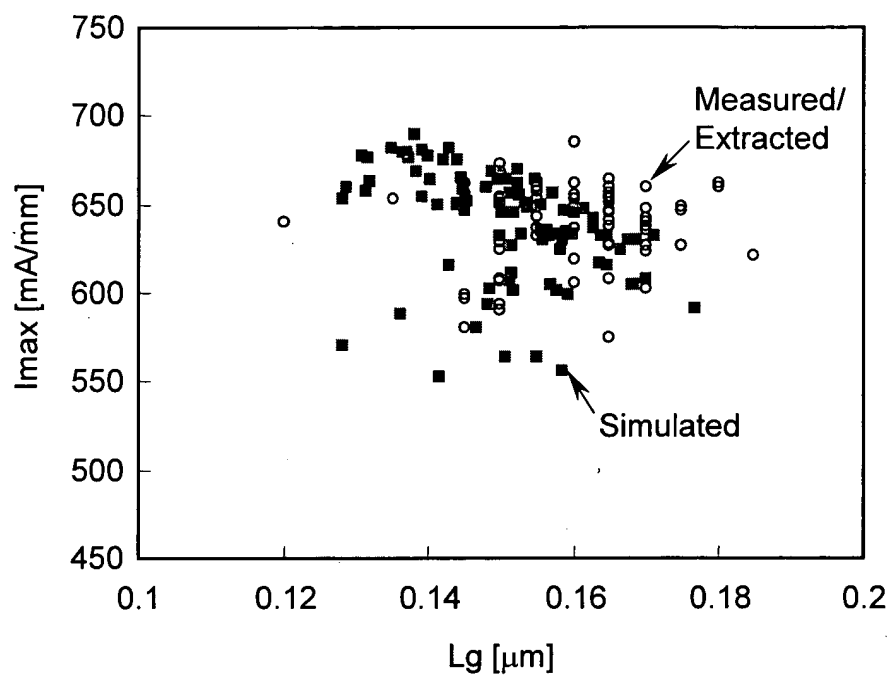


Figure 27

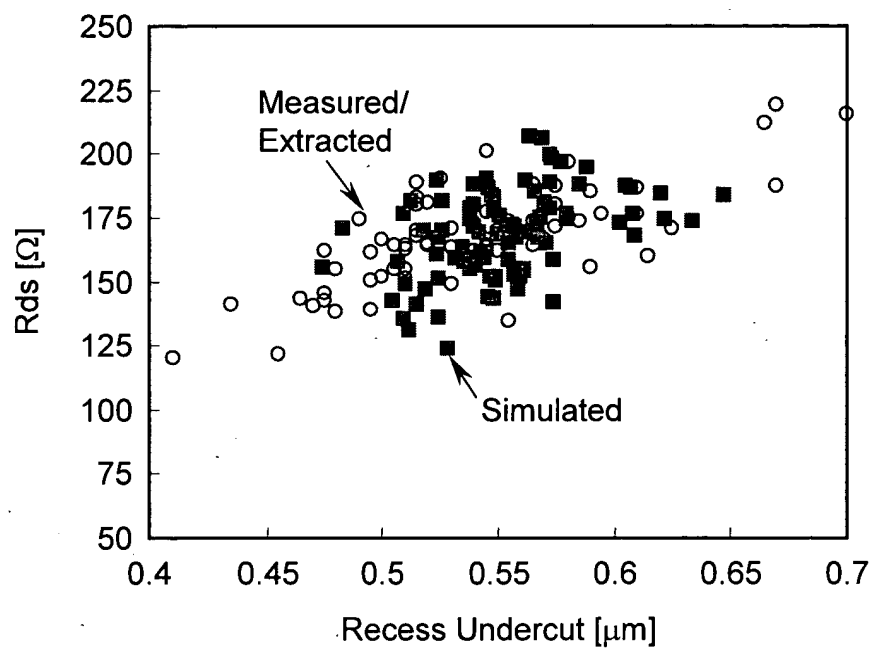


Figure 28